

# Message Bus Overview

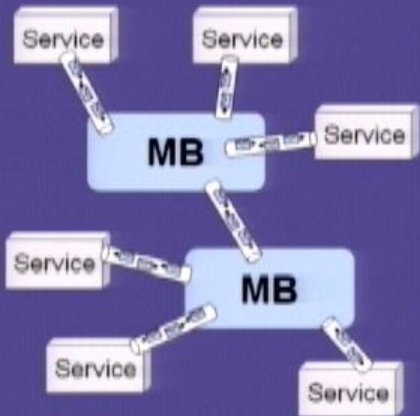
<http://indigo>

# Message Bus (MB)

- Mission
  - Make .NET the essential platform for building and deploying any distributed application
- Core values
  - General purpose messaging platform
  - Virtual network
  - Interop across trust domains and platforms

# Message Bus Features

- Rich, layered managed framework
  - Both server and EXE application models
- Content-based processing
- Routing and multicast
- Security
- Rich declarative semantics: types, policies, contracts
- Reliable messaging
- Transactions
- COM+ and DCOM interoperability
  - Including object remoting



# Agenda

- Content-Based Processing
  - Routing
  - Security
- Message Bus
  - Process architecture
  - Message framework
  - Service framework
- GXA
- Status
- Resources

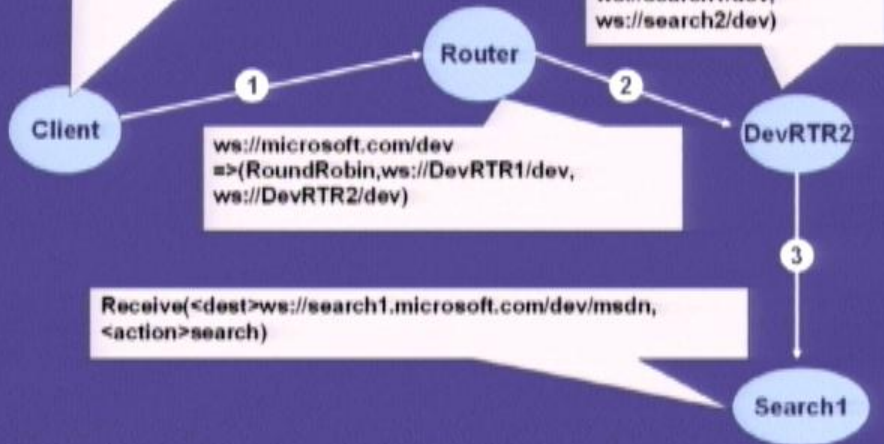
# Content-Based Processing

- MB routes messages to endpoints by matching selected message headers
- Message routes organized around URL hierarchy (URL is "primary key")
  - Enables efficient incorporation and storage of routing information
  - Consistent with Web programming model
- CBP is central paradigm for implementing the MB
- We extend CBP to become the organizing principle for distributed systems
  - Enables load balancing, fault tolerance, aggregate services, client prioritization, distributed security enforcement, etc.

# Routing Example (1)

Send(<dest>ws://microsoft.com/dev/msdn,  
<action>ws://search,...)

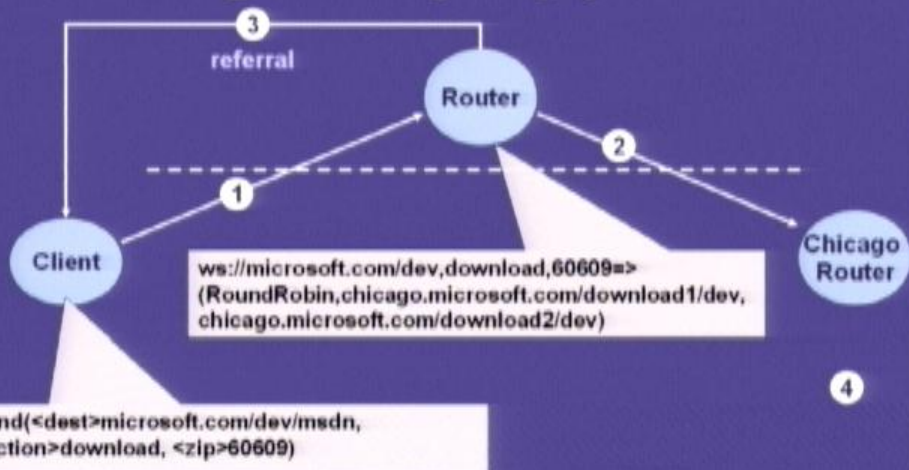
Search=> (RoundRobin,  
ws://search1/dev,  
ws://search2/dev)



# Routing and Referral

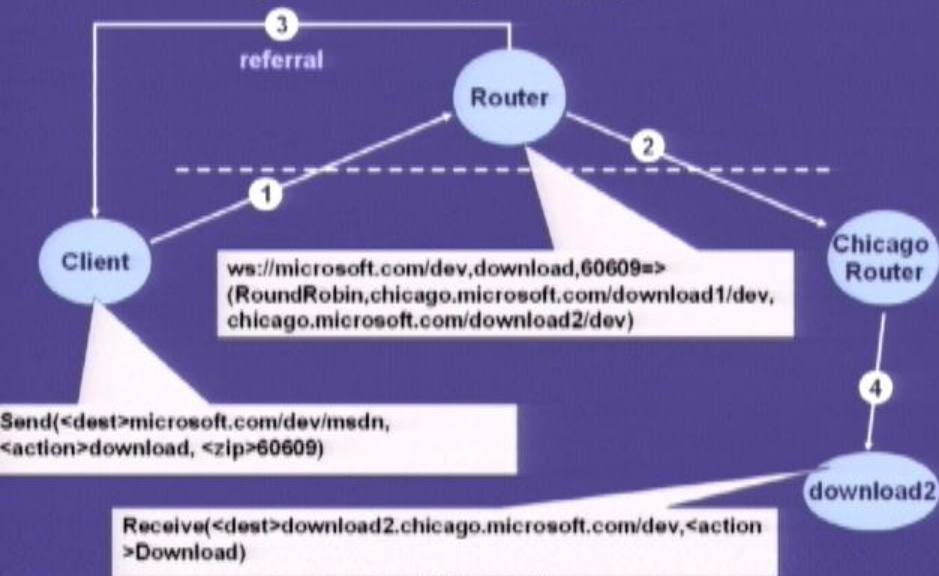
- Forward message if referral cache contains a matching entry
- Otherwise, forward to authoritative router
  - Routers may send async referrals back
  - Authorized applications and administrators may send referrals to configure router
  - Can change router data dynamically

# Routing Example (2)





# Routing Example (2)



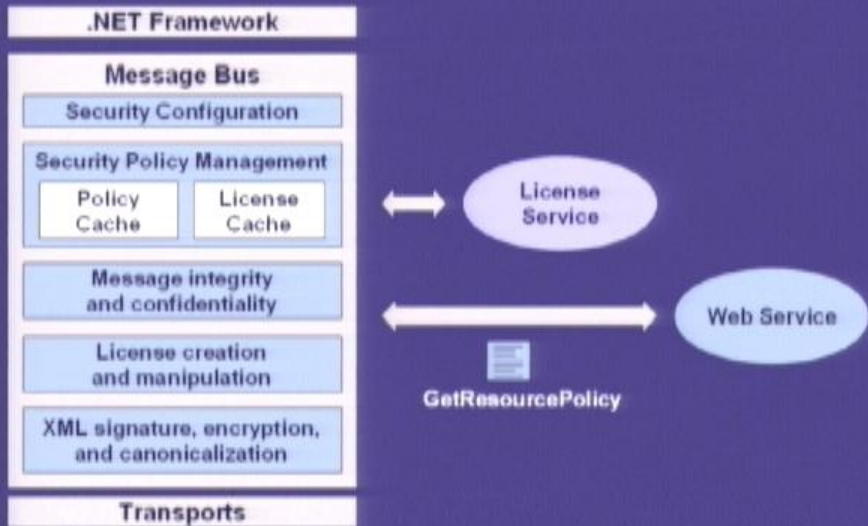
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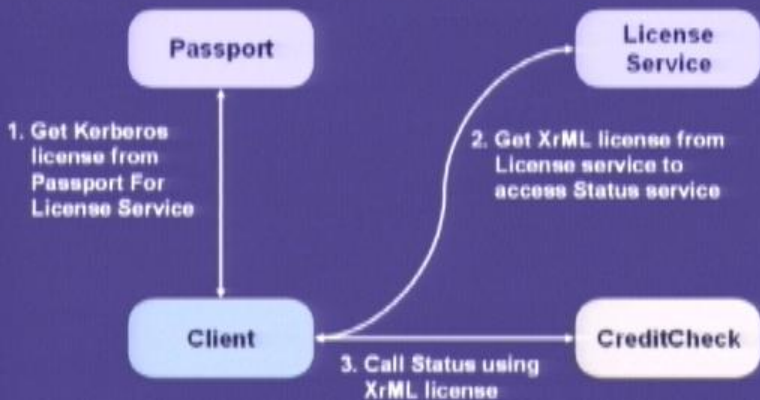
# Key Security Requirements

- Provide a composable security framework for Web services
  - Message integrity
  - Message confidentiality
  - Authentication
  - Authorization
- Integrate with existing mechanisms for identity

# Security Detail



# Example: Secure Service



Subsequent calls to Status service do not require presentation of Passport licenses

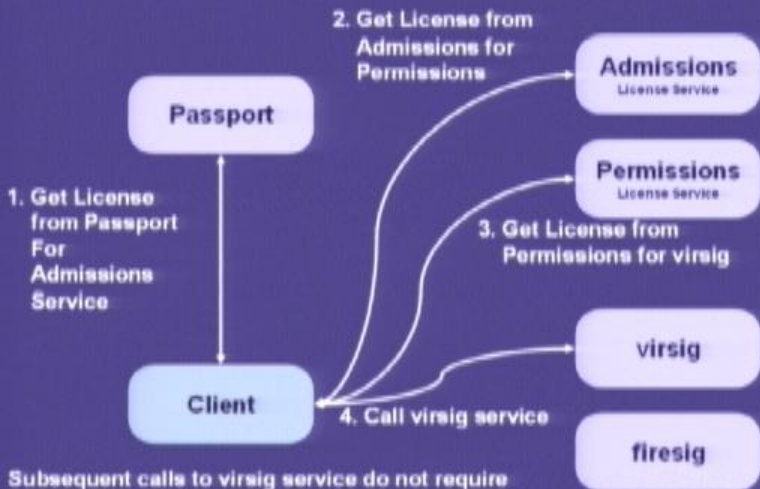
# Example: Global Secure Service

McAfee wants to  
provide updates to  
their virus and  
firewall software  
as a Web Service...

McAfee wants to use  
Akamai to provide  
distribution for their  
Web Services...



# Example: Global Secure Service (cont.)



Subsequent calls to virsig service do not require presentation of Passport or Admissions licenses

# Coordination with Passport

- Alignment with the MB security model
  - Features added over the next 12-24 months
  - 3.0 protocol work to be GXA-based
- Federation
  - Build on the relevant MB specifications
  - Act as a GXA license server
- Enhance its existing protocol
  - Change the cookie-based protocol to use MB-compatible messages



# Coordination with Windows

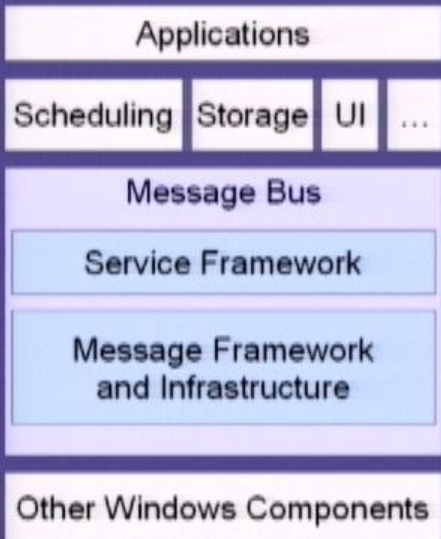
- Align in Longhorn and beyond
- Work under investigation
  - Windows trust → derived or natively WS-Trust
  - Windows domain controllers and certificate authority
    - License service
      - Netlogon → use licenses in secure channel setup
      - Kerberos → carries MB licenses in the PAC
  - NT tokens/security contexts from MB licenses
  - Roles-based authorization
    - Consumes WS-Authorization
    - Can render results as XrML

# Agenda

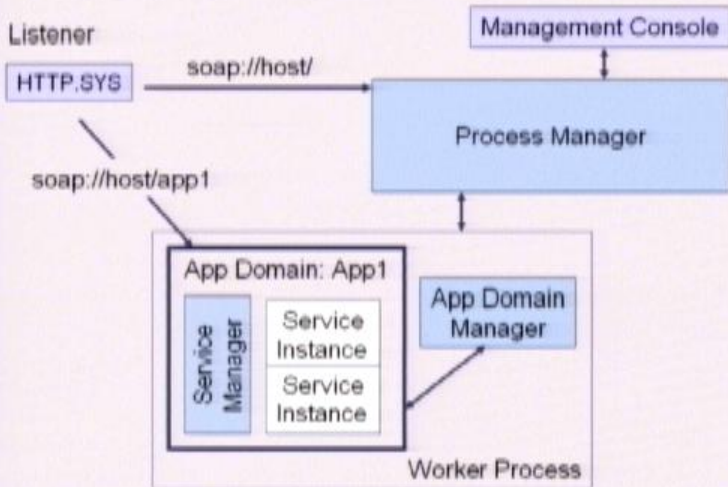
- Content-Based Processing
  - Routing
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# Microsoft Messaging Stack

- Indigo will provide distributed messaging in the Longhorn API
- Provides features of COM+ services
- Common distributed security model with Passport and Windows



# MB Process Architecture



# Listener

- Ex: HTTP.SYS
- Listens on a transport and passes messages to the router
  - For TCP-based protocols, generally owns a TCP port
  - Allows processes to register for pieces of the namespace
  - Transports vary quite a bit (asymmetric vs. symmetric, stream vs. packet, etc), and we abstract that

# Transport Adapters

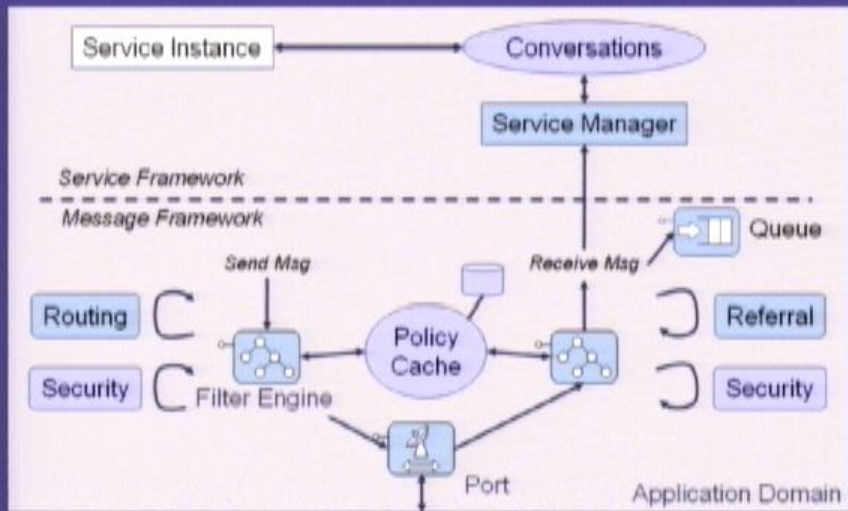
- Core dispatcher has no knowledge of transport
  - WS protocols are transport neutral
  - Initial Web Services specified HTTP binding
  - GXA specifies TCP and UDP bindings
- Transport adaptor
  - Maps on-wire format to / from message object
  - Listener end – receives incoming messages, creates message objects, and submits them
  - Talker end – takes message objects, creates network buffers, and sends the outgoing message
  - Talker and listener do not need to be in the same process
- Anyone can write a transport adapter

# Process Manager

- Responsible for managing processes containing application domains
  - Registers with listeners for entire namespace
  - Maps namespace to application code
  - Launches processes to instantiate application domains
  - Manages process recycling and termination
  - Is a router



# App Domain Architecture





# Agenda

- Content-Based Processing
  - Routing
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# Services Framework

- Emphasizes productivity and correctness
  - Constrained set of operations
- Approachable concurrency model
- State management integrated with reliable communications and transactions
- Build on top of Message Framework

# Services Code Example

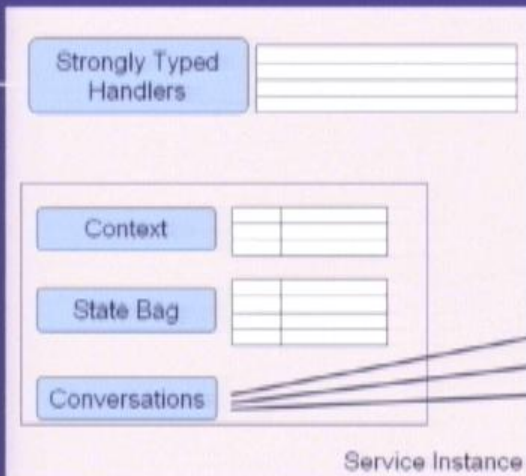
```
using System.MessageBus;  
using System.MessageBus.Services;  
  
[ ServiceContract("creditcheck.wsdl+") ]  
class CreditService : Service {  
    string CreditCheck(string ssid) {  
        Dialog d =  
        OpenDialog("//logcollector.com/creditcheck");  
        d.Send(new Message(ssid));  
        d.Close();  
        return "Approved.";  
    }  
}
```

# Service Instances

- When an incoming dialog arrives at a service, a new service-instance is created
  - When the "Credit-Check" service is invoked, a new, individual credit check will be processed
  - This is like getting a new component-instance when performing a CoCreateInstance
  - We will need to support some option for allowing an incoming dialog to target an existing instance
- The new service instance will have private service state
- Each service instance will own a thread while it is active
- Each service instance gets its very own GUID

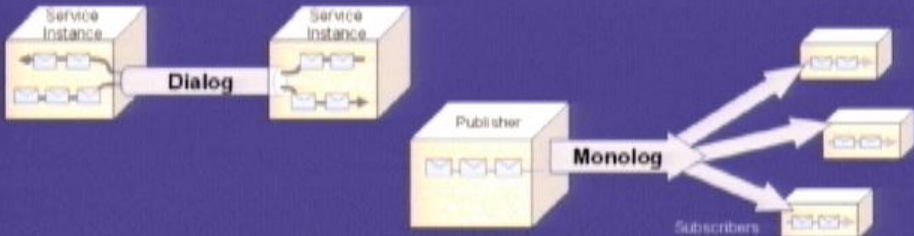
# Service Instances (cont.)

Service Interface



# Services, Dialogs, and Monologs

- Services communicate using dialogs and monologs
  - Dialogs provide bi-directional messaging between two services
  - Monologs provide uni-directional messaging between one publisher and many subscribers
- Services send messages over dialogs and monologs
  - Messages are typed
    - Both the sender and receiver understand message type
  - The dialog or monolog controls the delivery of the message to its destination service(s)



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# Global XML Web Services Architecture (GXA)

- Business Goals
  - Drive XML Web Services as industry-accepted approach to heterogeneous environments
    - Technically superior to J2EE cross-platform portability
  - Help unblock .NET adoption
    - Interoperates with customers existing investments
    - Blunt perception that .NET locks in customers
  - Generate developer excitement (a la SOAP)

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# GXA External Definition

- MS protocol architecture for XML Web Services
- A set of protocol specifications and guidance for how these protocols compose together
- Platform, language, implementation independent
- Licensed for broad adoption
- Submitted to the appropriate standards bodies

# GXA Core Services

**GXA**

**Messaging**

**Discovery**

**Security**

**Reliable  
Messaging**

**Transactions**

**SOAP and XML**

**Internet Transport**

# GXA Core Messaging

Spec	IBM	Notes
SOAP	Joint	W3C Recommendation in Q3'02
DIME	Joint	Submitted to IETF
WS-Routing	Joint	Published PDC'02; working with BEA, IBM to update
WS-Referral	Joint	Published PDC'02; working IBM

# GXA Discovery & Metadata

Spec	IBM	Notes
WSDL	Joint	W3C Working Group
UDDI	Joint	Web service directory
WS-Inspection	Joint	Published PDC'02
WS-Policy	WBA	Representing, scoping, naming, and exchanging policies
WS-Contract	Internal	Contract language between Web service endpoints

# GXA Security

Spec	IBM	Notes
WS-Security	Joint	Released jointly with IBM, Verisign. Sent to OASIS
WS-Trust	Internal	Request/issue tokens and manage trust
WS-Secure Conversation	Internal	Exchanging tokens, deriving keys, authenticate
WS-Privacy	WBA	Privacy model and policy



# GXA Agreements

Agreements	IBM	Notes
WS-ReliableMessaging	Internal	Exactly once, in-order delivery
WS-Transaction and WS-Coordination	WBA	Expected August 2002



# Other GXA Activities

- Web Services Interop Org (WS-I)
  - Capture definition of "Web Services"
  - Define consistent sets of GXA specs
  - <http://www.ws-i.org>
- GXA Design Review
  - US: Apr '02, Europe: May '02
  - Covered core messaging, security, reliable messaging and transaction
  - NDA with 300+ companies

# Agenda

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# Message Bus Status

- Currently in M3 integration and stabilization
- Anticipate
  - 2 more coding milestones after M3
  - 2 betas
- M4 coincides with PDC, where we will release preview bits
- RTM 1H04 with Longhorn client
- Note: We are hiring actively for our test org!

# Resources

- For more info:
  - <http://indigo> (see workbook, overview decks)
  - <mailto:inditalk> (for questions about Indigo)
  - <http://gxa> (status on specs and links to them)
  - <http://www.ws-i.org> (interop org)

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# Web Services Development Kit

<http://www.microsoft.com/webservices/>

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**Keith Ballinger**  
**Program Manager**  
**Web Services Development Kit**

# Purpose

- **Demonstrate leadership.**
  - It was infuriating to have IBM beating us to market on our own specs
  - Drive and visibly lead spec design
- **Customer benefits**
  - Customer feedback as well
- **Team benefits**
  - get the specs right by coding against it
  - build up team expertise (shipping, testing interop, testing security)

---

# Mission Statement

*Leading Web services to their full potential  
NOW.*

# Themes

- First release is about *GXA Building Blocks*
  - WS-Routing
  - Security: Integrity, Encryption, Credentials
- What's in V1?
  - Docs
  - Samples
  - Class Library Functionality
  - Tools



# Schedule

- Beta release set for 8/30
- V1 RTW release set for 10/30
- Expected V1 RTW – next spring

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# Customers

- **Pri 1: Advanced Web Services Developer**
  - Advanced Web services developer
  - Wants a wide variety of additional functionality
  - Experienced with multiple SOAP APIs
- **Pri 2: Intermediate Web Services Developer**
  - Typical VB Corporate Developer
  - Wants certain advanced features
  - Needs as little pain as possible
- **No support for native**

# Customers Scenarios in V1

## ■ Pri 1

- Signing messages
- Header-based routing
- Logical names decoupled from topology

## ■ Pri 2

- Firewall traversal
- Encryption

# Dependencies

- V1 is on top of VS.NET V1
- Toolkit will not replace core functionality
- Features will bolt on the existing framework
  - Using low-level extensibility points: WebRequest, HTTP Modules, etc

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# Compatibility

- **Last release will wire interop with Indigo V1**
  - No programming model guarantees
- **Releases will not be guaranteed to wire interop with previous versions of the toolkit**

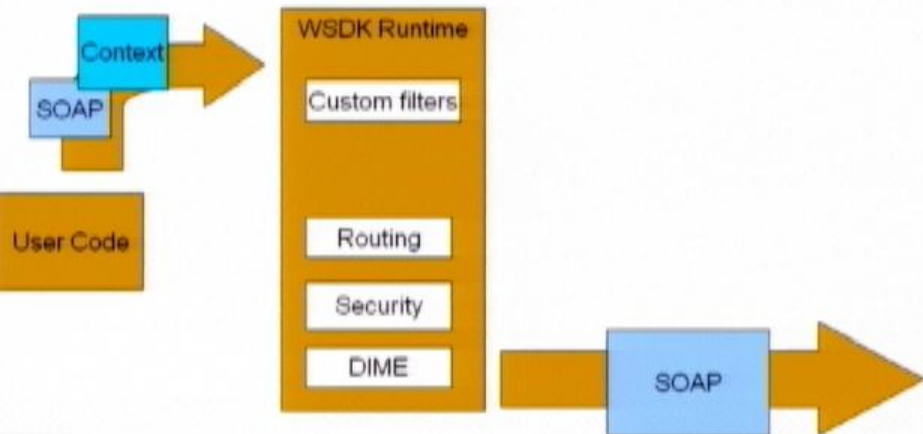
# Packaging and Release Vehicles

- Web release on MSDN
- CD for Magazines, etc
- Events

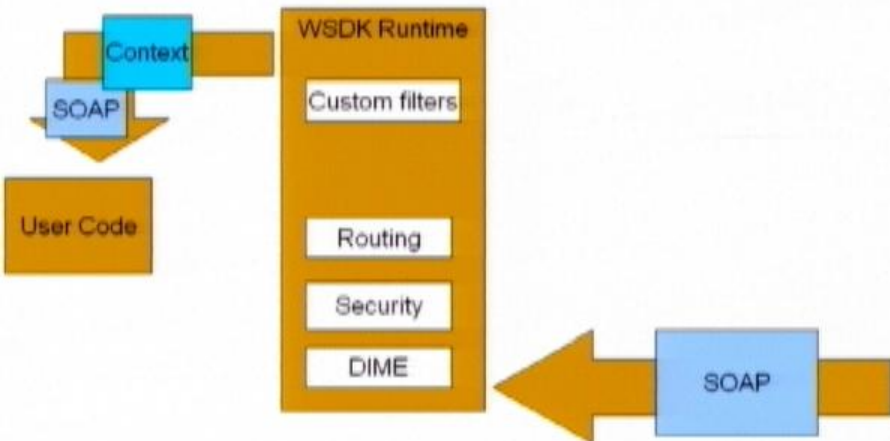
# Programming Model

- **SoapContext**
  - .Referrals
  - .Security
  - .Path
  - .Attachments
- **Filled up by user code when sending a message**
- **Read by user code when receiving a message**

# Sending a message

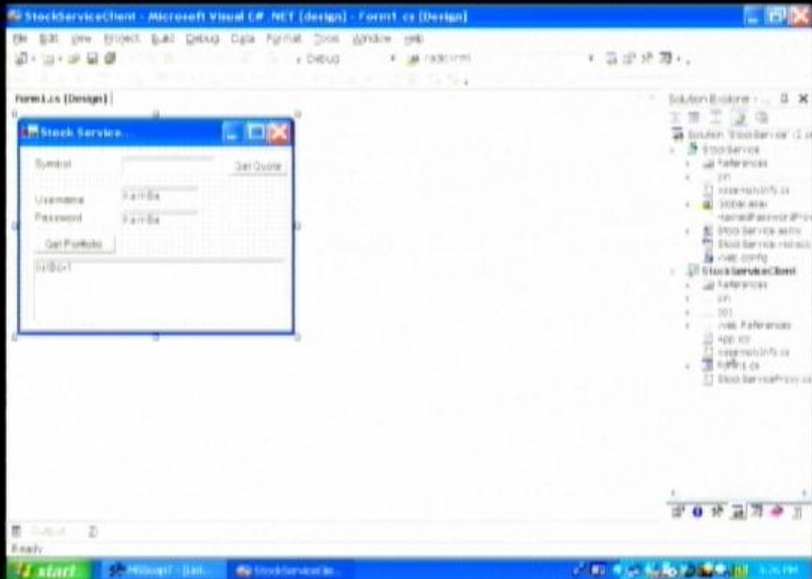


# Receiving a message



# Demo

- Let's build a V1 ASP.NET Web service
- Then, let's add the WSDK...
- Finally, let's add a message expiration
  - And read it on the other side...



## StockService

The following operations are supported. For a formal definition, please review the [service description](#).

- [GetPortfolio](#)
- [GetQuote](#)

This web service is using <http://tempuri.org/> as its default namespace.

**Recommendation:** Change the default namespace before the XML Web service is made public.

Each XML Web service needs a unique namespace in order for client applications to distinguish it from other services on the Web. <http://tempuri.org/> is available for XML Web services that are under development, but published XML Web services should use a more permanent namespace.

Your XML Web service should be identified by a namespace that you control. For example, you can use your company's Internet domain name as part of the namespace. Although many XML Web service namespaces look like URLs, they need not point to actual resources on the Web. (XML Web service namespaces are URIs.)

For XML Web services created using ASP.NET, the default namespace can be changed using the WebService attribute's namespace property. The WebService attribute is an attribute applied to the class that contains the XML Web service methods. Below is a code example that sets the namespace to "http://microsoft.com/webservices/".

```

C#
[WebService(Namespace="http://microsoft.com/webservices/")]

```



StockService

The following operations are supported. For a formal definition, please review the [WebServiceDescription](#).

- [GetStockInfo](#)
- [GetQuote](#)

Source Explorer - StockService

- StockService (2 projects)
- StockService
  - References
  - obj
  - AssemblyInfo.cs
  - Global.asax
  - HttpContextProvider.cs
  - StockService.svc
  - StockService.svc.cs
  - WebResource.cs

Output

Name	Value	Type	Output
			SetAuthDomain: Loaded 'c:\windows\microsoft.net\framework\
			StockServiceClient: Loaded 'c:\documents and settings\user\
			StockServiceClient.exe: Loaded 'c:\windows\assembly\user\
			StockServiceClient.exe: Loaded 'c:\windows\assembly\user\
			StockServiceClient.exe: Loaded 'c:\windows\assembly\user\

File View Window Help

127.0.0.1

- Message # 1
- Message # 2

```
<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wsp:path
      soap:actor="http://schemas.xmlsoap.org/soap/actor/next"
      soap:mustUnderstand="1"
      xmlns:wsp="http://schemas.xmlsoap.org/rp">
      <wsp:action>http://tempuri.org/GetQuote</wsp:action>

      <wsp:to>http://localhost:9090/StockService/StockService.asmx</wsp:to>
      <wsp:id>uuid:918a9996-e356-496b-8500-
        b533e668ed65</wsp:id>
    </wsp:path>
  </soap:Header>
  <wame:messageTimes
```

```
<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wame:messageTimes
      xmlns:wame="http://schemas.xmlsoap.org/ws/2002/01/msgext">
      <wame:created>2002-07-12T22:26:39Z</wame:created>
    </wame:messageTimes>
  </soap:Header>
```

```

127.0.0.1
  Message # 1
  Message # 2

```

```

<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wse:Path
      soap:actor="http://schemas.xmlsoap.org/soap/actor/next"
      soap:mustUnderstand="1"
      xmlns:wse="http://schemas.xmlsoap.org/ws/">
      <wse:action>http://tempuri.org/GetQuote</wse:action>

      <wse:to>http://localhost:9090/StockService/StockService.asmx</wse:to>
      <wse:id>uuid:918a9996-e356-498b-8500-
        b533e688ed65</wse:id>
    </wse:Path>
  </soap:Header>
  <wame:MessageTimes
    xmlns:wame="http://schemas.xmlsoap.org/ws/2002/01/msgext">
    <wame:created>2002-07-12T22:26:39Z</wame:created>
  </wame:MessageTimes>
</soap:Header>
<soap:Body>
  <GetQuote xmlns="http://tempuri.org/">
    <Symbol>MSFT</Symbol>
  </GetQuote>

```

```

<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"

```

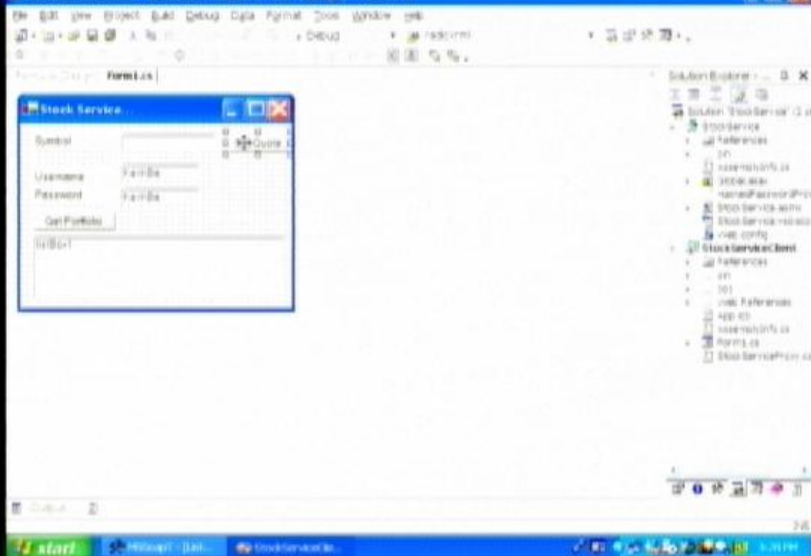
File View Window Help

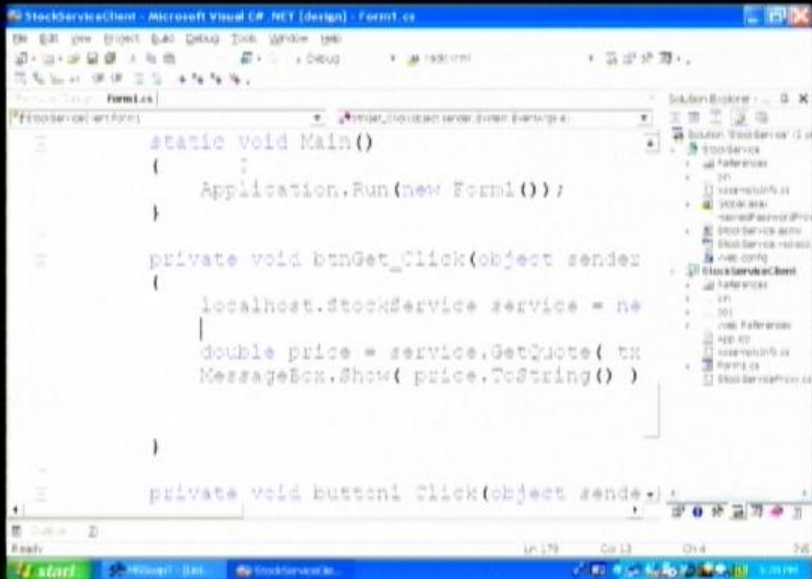
```
127.0.0.1
+ Message # 1
+ Message # 2
```

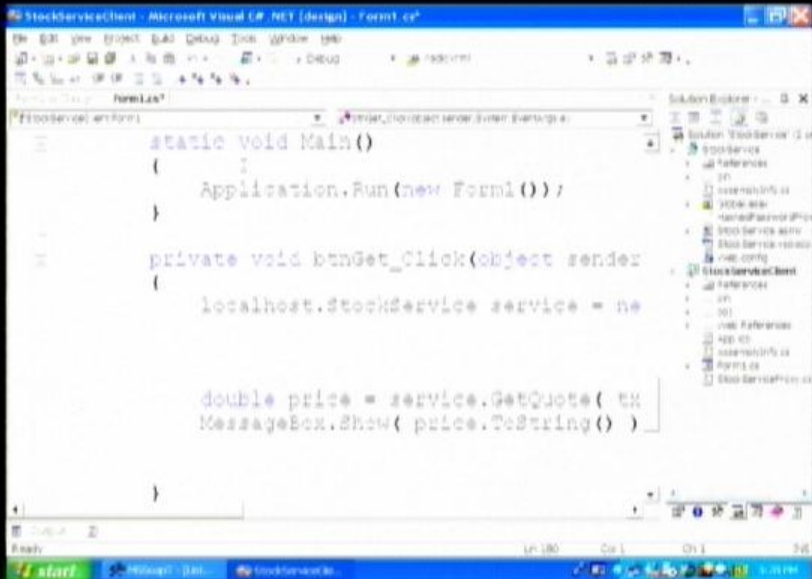
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<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
```

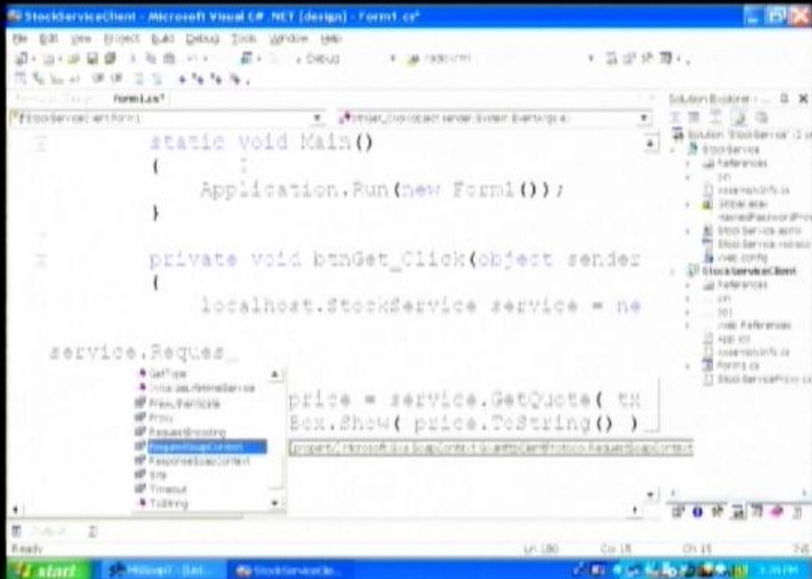
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<?xml version="1.0" encoding="utf-8" ?>
```

```
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wsse:MessageDigest
      xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/01/msdpext">
      <wsse:created>2002-07-12T22:26:39Z</wsse:created>
    </wsse:MessageDigest>
  </soap:Header>
  <soap:Body>
    <GetQuoteResponse xmlns="http://tempuri.org/">
      <GetQuoteResult>120</GetQuoteResult>
    </GetQuoteResponse>
  </soap:Body>
</soap:Envelope>
```

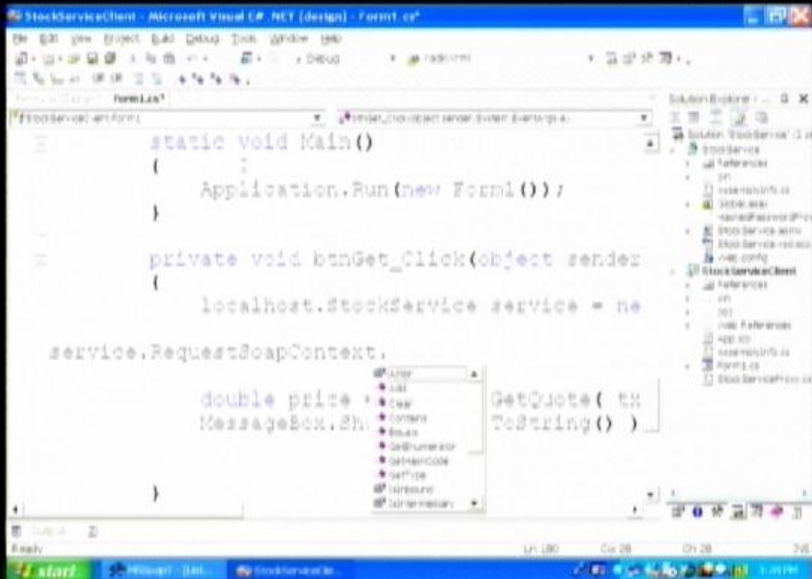


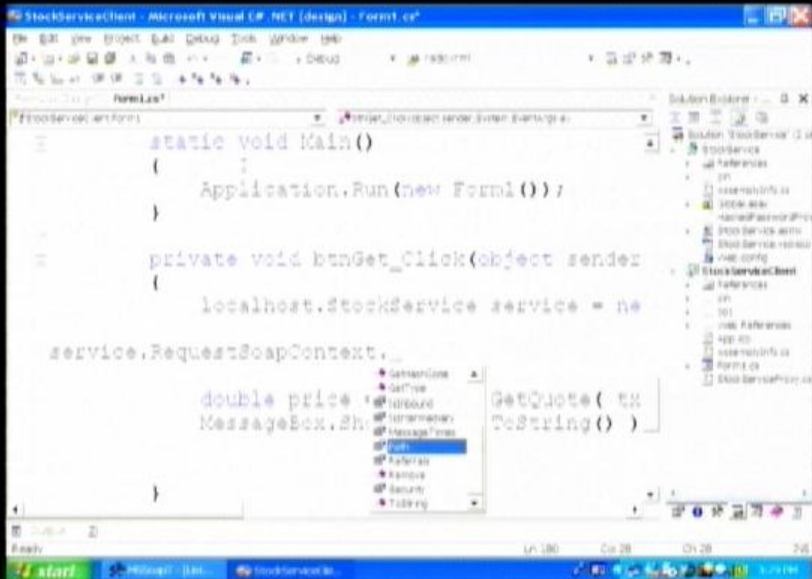


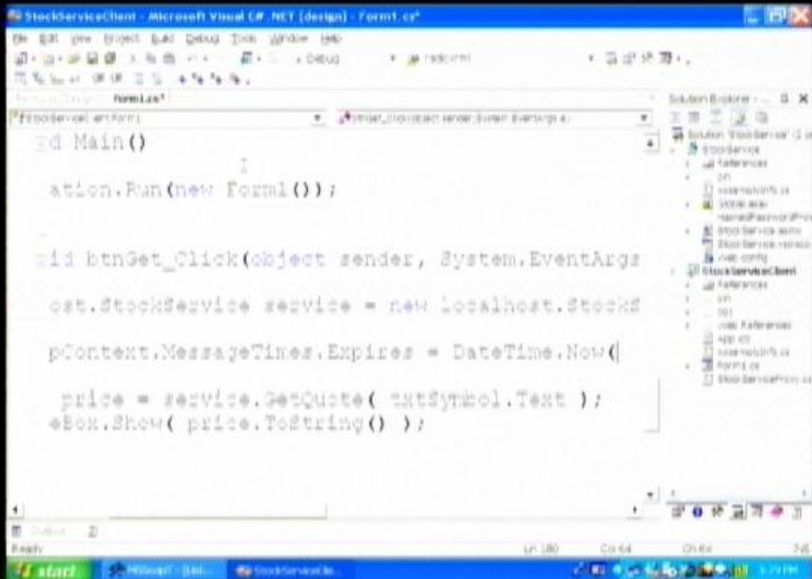




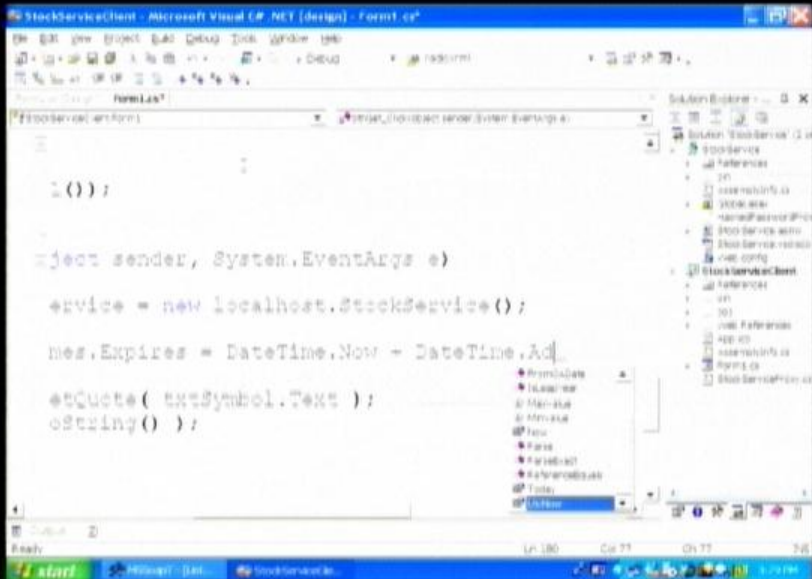














StockServiceClient - Microsoft Visual C# .NET [design] - Form1.cs

File Edit View Project Build Debug Tools Window Help

Form1.cs (Form1)

```
public void InitializeComponent()  
{  
    // ...  
}  
  
private void btn_Click(object sender, EventArgs e)  
{  
    // ...  
}
```

Solution Explorer

- Solution 'StockServiceClient' (2 projects)
  - StockServiceClient
    - References
    - bin
    - AssemblyInfo.cs
    - StockServiceClient.csproj
    - StockServiceClient.Properties.Resources
    - StockServiceClient.Properties.Resources.Designer.cs
    - StockServiceClient.Properties.Resources.resx
    - StockServiceClient.Properties.Resources.config
    - StockServiceClient
    - References
    - bin
    - obj

Task List - Build Error List (Error)

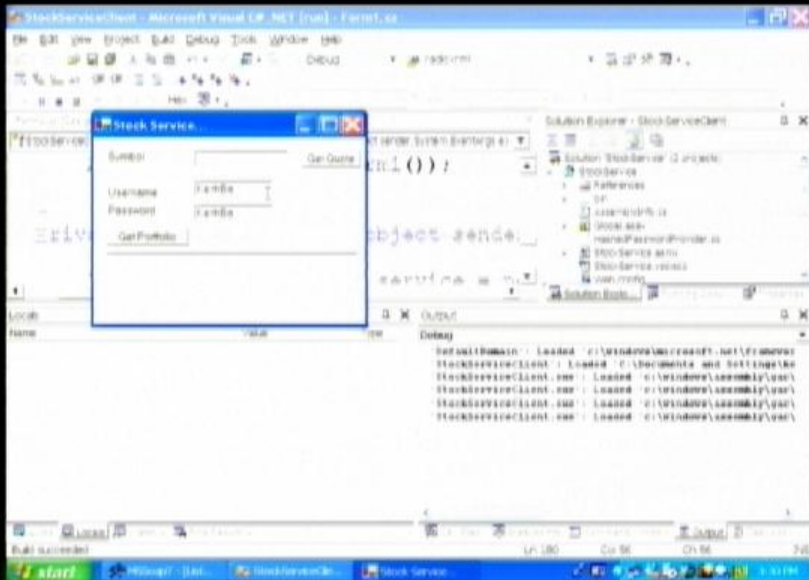
Description	File	Line
Property of object Microsoft.SqlServer.Server.SqlStringParameter cannot be assigned to -- it is read only	C:\Documents and Settings\user\My Documents\StockServiceClient\Form1.cs	100

Ready

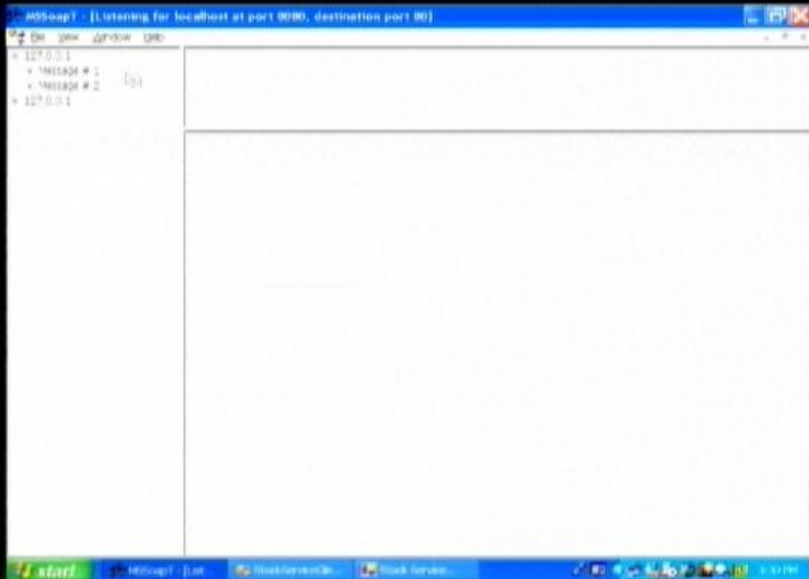
Ln 20 Col 1 On 1 2/6

start

Windows Taskbar







File View Window Help

```

127.0.0.1
+ Message # 1
+ Message # 2
127.0.0.1
+ Message # 1

```

```

<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <warp:path
      soap:actor="http://schemas.xmlsoap.org/soap/actor/next"
      xmlns:warp="http://schemas.xmlsoap.org/rp">
      <warp:action>http://tempuri.org/GetQuote</warp:action>

      <warp:to>http://localhost:8080/StockService/StockService.asmx</warp:to>
      <warp:id>uuid:f3207b4b-e175-4a99-8e5e-
        3170deecf32b</warp:id>
    </warp:path>
  </soap:Header>
  <wame:messageTimees
    xmlns:wame="http://schemas.xmlsoap.org/ws/2002/01/msgext">

```

```

<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wame:messageTimees
      xmlns:wame="http://schemas.xmlsoap.org/ws/2002/01/msgext">
      <wame:created>2002-07-12T22:30:24Z</wame:created>
    </wame:messageTimees>
  </soap:Header>

```

# Security Programming Model

- `SoapContext.Security.Add( Security header )`
- Create a Security header for a particular actor
  - Add tokens
  - Signatures
  - Encryption

## Security Demo

- Let's take our previous demo
- Add a username token
- The verify the token on the server side
- Finally, encrypt the message with an x.509 cert
  - Many other security actions possible, these are just a couple...

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Form 1.06

File Services (api form)	Server (11/15/2017 10:00 AM) Server (11/15/2017 10:00 AM)
--------------------------	---

```
Application.Run(new Form1());
```

```
private void btnGet_Click(object sender, System.
```

```
localhost:StockService service = new localho
```

```
requestGapContext.Path.MustUnderstand = false;
```

```
double price = service.GetQuote( txtSymbol.Text );
```

```
MessageBox.Show( price.ToString() );
```

```
private void button1_Click(object sender, System.
```

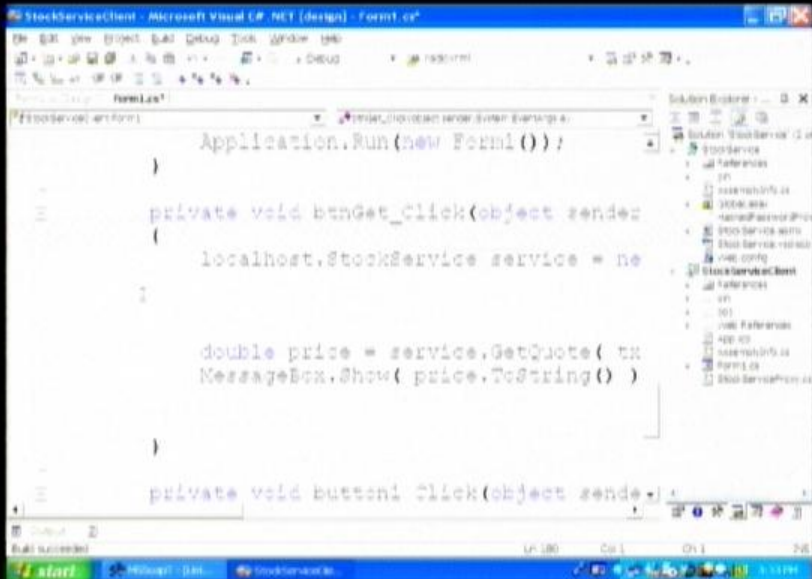
1000

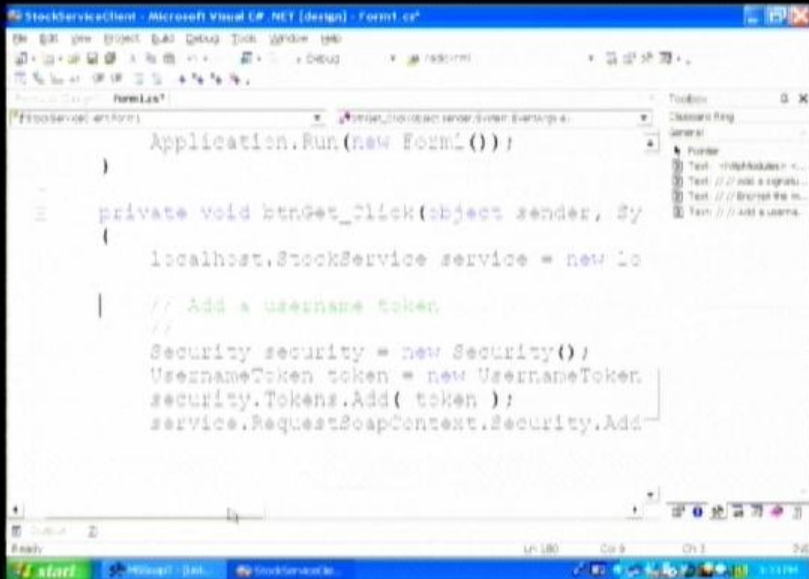
45280

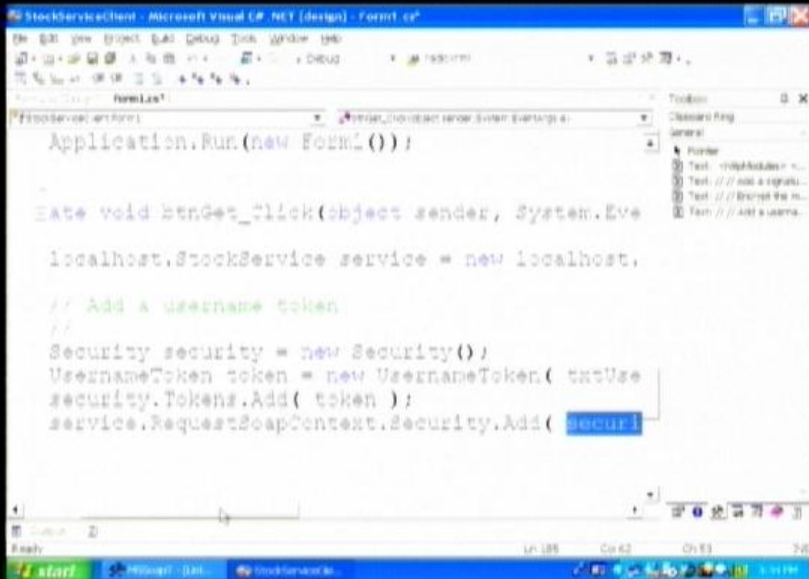
Case 14

On 8/8

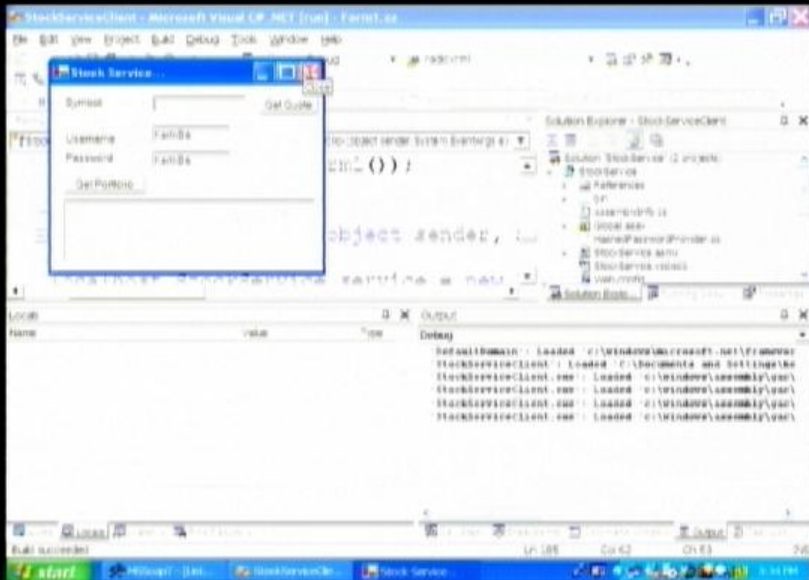
10











File View Window Help

```

> 127.0.0.1
  x 1401304 #1
  x 1401304 #2
> 127.0.0.1
  x 1401304 #1
> 127.0.0.1
  x 1401304 #1

```

```

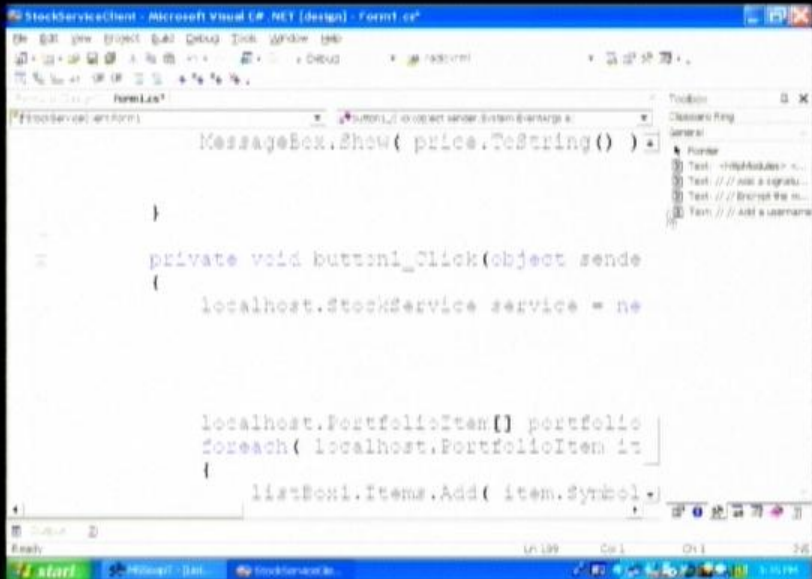
<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Header>
    <wse:Security xmlns:wse="http://schemas.xmlsoap.org/ws/2002/04/secext">
      <wse:UsernameToken Id="SecurityToken-d197a359-fdc5-46d8-8dd0-48e7f60e537b">
        <wse:Username>KeithBa</wse:Username>
        <wse:Password Type="wse:PasswordDigest">slcmZ0egziZOMDXEqnEPKl8my+H=</wse:Password>
      </wse:UsernameToken>
    </wse:Security>
  </soap:Header>
  <soap:Body>
    <GetQuote xmlns="http://tempuri.org/">
      <Symbol>MSFT</Symbol>
    </GetQuote>
  </soap:Body>
</soap:Envelope>

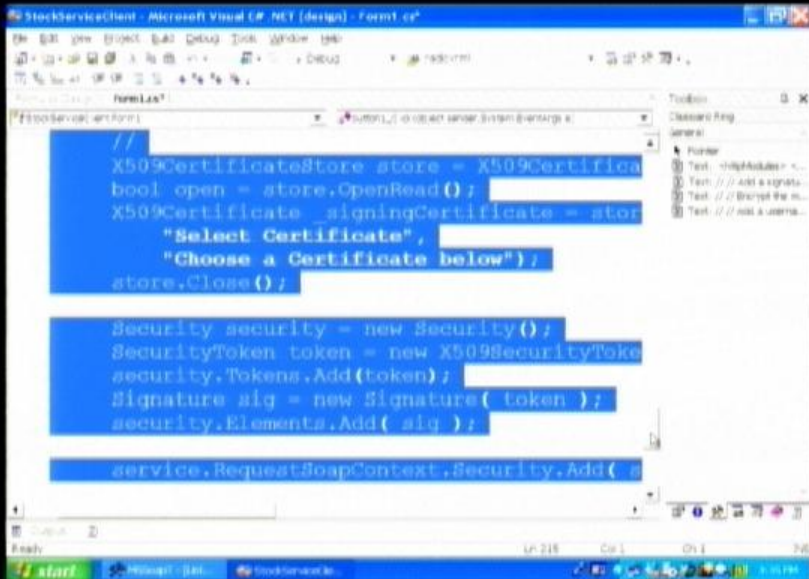
```

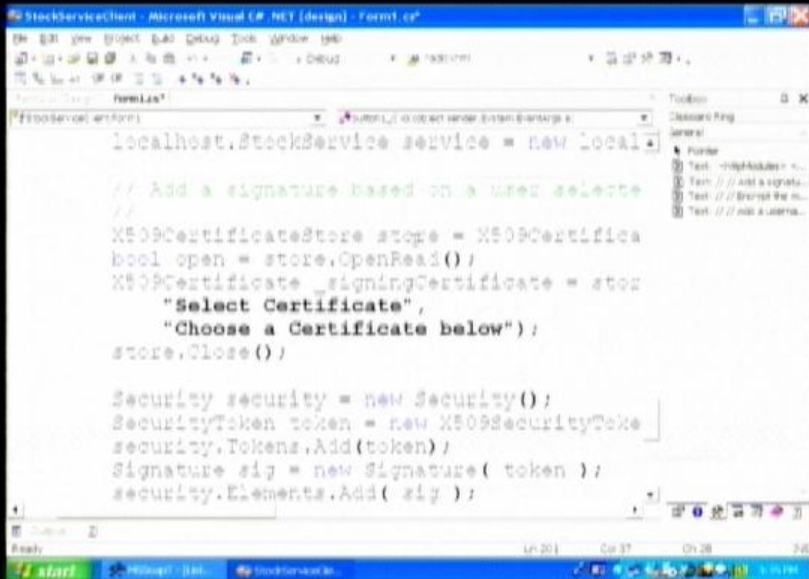
```

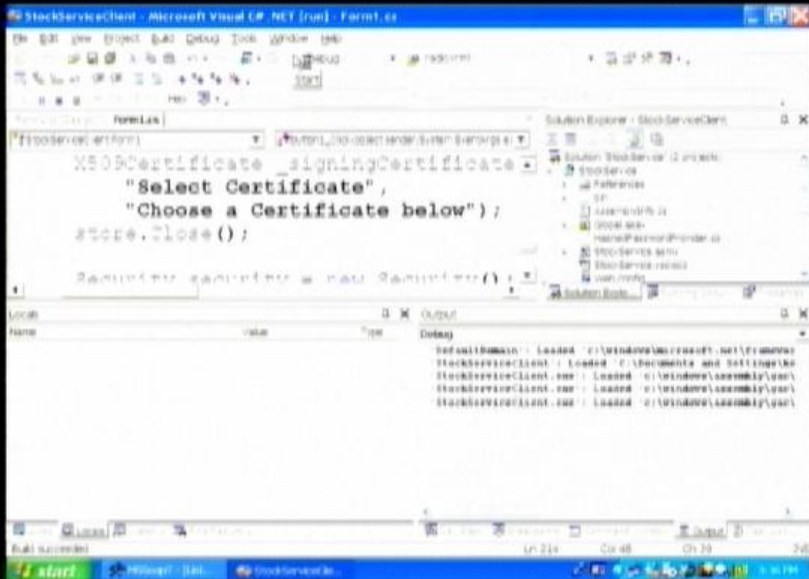
<?xml version="1.0" encoding="utf-8" ?>

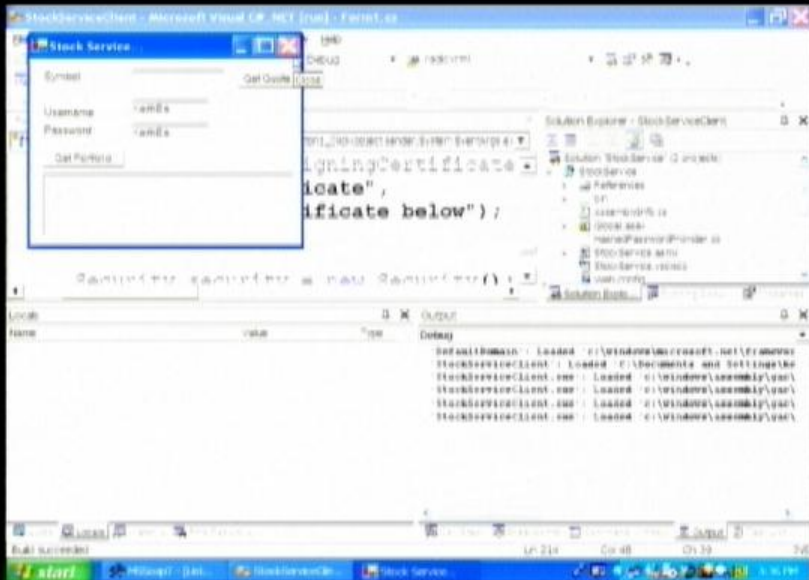
```

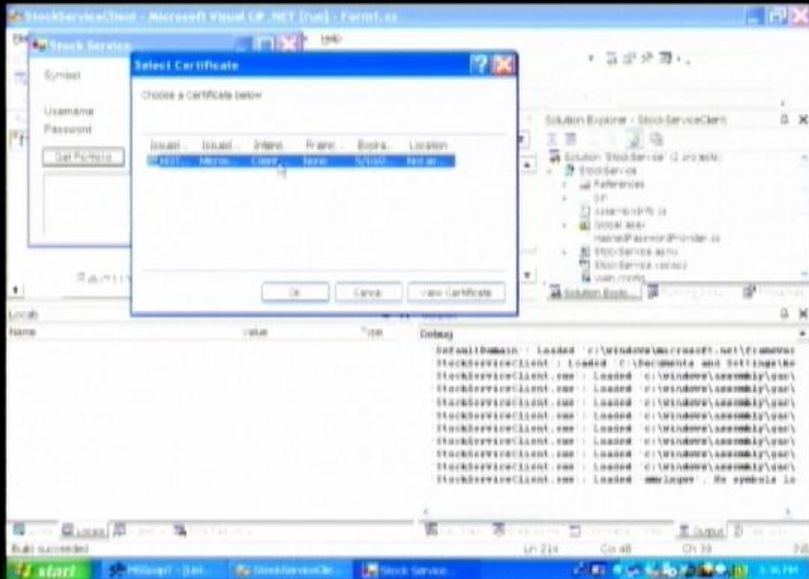




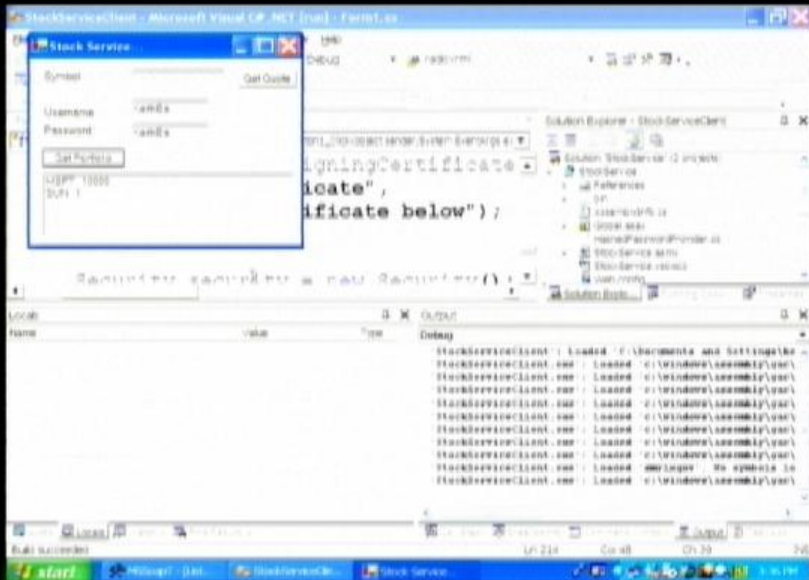












- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1
  - \* 14418000 # 2
- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1
- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1
- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1
- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1
- \* 12<sup>9</sup> 0.0.1
  - \* 14418000 # 1

```
<?xml version="1.0" encoding="UTF-8" ?>
<?wsrp:to>http://localhost:8080/StockService/StockService.asmx</wsrp:to>
<?wsrp:id>uuid:2df09f73-6f1a-442f-9f03-6a894b12ecb1</wsrp:id>
</wsrp:path>
<?wsme:messageTimes>
  <?xmlns:wsme="http://schemas.xmlsoap.org/ws/2002/01/mesext">
    <?wsme:created>2002-07-13T21:38:03Z</wsme:created>
  </wsme:messageTimes>
</?wsme:Security soap:mustUnderstand="1">
  <?xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/secext">
    <?wsse:BinarySecurityToken ValueType="wsse:X509v3"
      EncodingType="wsse:Base64Binary" Id="SecurityToken-638e31c0-545e-4187-a8ad-74b0b1d56dfd">MIIGDzCCBV+gAwIBAgIKFGG8kwADAAKHVzANBgkqh
    </Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
      <?SignedInfo>
        <?CanonicalizationMethod
          Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
        <?SignatureMethod
          Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1"/>
      </Reference URI="">
      <?Transform>
        <?Transform
```

The XML page cannot be displayed

Can't use HTML input using style sheet. Please correct the error and then click the button below to save.



8b3

```
<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Header>
    <wsme:messageTimes
xmlns:wsme="http://schemas.xmlsoap.org/ws/2002/01/ms
gext">
      <wsme:created>2002-07-12T22:38:05Z</wsme:created>
    </wsme:messageTimes>
    <wsse:Security soap:mustUnderstand="1"
xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/se
cext">
      <xenc:EncryptedKey
Type="http://www.w3.org/2001/04/xmlenc#EncryptedKey"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">
        <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"
```

```
Abc.xml - Notepad
File Edit Format View Help

<wsme:created>2002-07-12T22:38:05Z</wsme:created>
  </wsme:messageTimes>
  <wsse:Security soap:mustUnderstand="1"
xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/se
cext">
    <xenc:EncryptedKey
Type="http://www.w3.org/2001/04/xmlenc#EncryptedKey"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">
      <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"
/>
      <KeyInfo
xmlns="http://www.w3.org/2000/09/xmldsig#">
        <KeyName>CN=KEITHBA4.redmond.corp.microsoft.com</Key
Name>
        </KeyInfo>
        <xenc:CipherData Nonce="8">
          <xenc:CipherValue>atBQ+buHHsgJRxDM86Noh+IJGbnWrJzpy/
9eOW9+Ohv7BOAmpqbUxxqFF9TrihrwEz71+V9TpKND9JfghZf83E
T777+1ZXiIvXMC+YCfpX/gy6E8Epr0QHHjE+mK01ixi0EhqpY7TD
```

```

&#x2D;wsme:created>2002-07-12T22:38:05Z</wsme:created>
  </wsme:messageTimes>
  <wsse:Security soap:mustUnderstand="1"
xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/se
cext">
    <xenc:EncryptedKey
Type="http://www.w3.org/2001/04/xmlenc#EncryptedKey"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">
      <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"
/>
      <KeyInfo
xmlns="http://www.w3.org/2000/09/xmldsig#">
        <KeyName>CN=KEITHBA4.redmond.corp.microsoft.com</Key
Name>
        </KeyInfo>
        <xenc:CipherData Nonce="8">
          <xenc:CipherValue>atBQ+buhHsgjRxDM86Noh+IJGbnWrjZpy/
9eOW9+Ohv7BOAmpqbUxxqFF9TrihrwEz71+V9TpKND9JfghZf83E
T777+1ZXiIvXMC+YCfpX/gy6E8Epr0QHHjE+mK01ixi0EhQpy7TD

```

```
ABC.xml - Notepad
File Edit Format View Help

Type="http://www.w3.org/2001/04/xmlenc#Content"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#"
  <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#tripledes-cbc" />
  <xenc:CipherData Nonce="16">

<xenc:CipherValue>QSRMBDYafzmZOFXvnCIYdgan2ak2IA0K71
mzDZj1xODi7cw+XU7SmMLcfVnJqdsPEtwq0IKmfNfbuffgygKr7G
XOvrhkDhFhYI4x7M3lHtMljjcwnI3ZkTwa0iq3Hgb7jP2vutCgyu
xzeR2c8PEox7tfYiFSxRDSUQZ8osTV6mDwnPjHtCjqxEpTicqSLS
LNDxrPKadJOjWm5X9sbQvH847Zk6ewSHQLKAT7BoKh6ousDgQd3h
nkLUBAQhFIYG+wU2wzqXeP0WJ9MRC0/qSEdR/cpP74ozGf8cX1U1
YLVQnn+v8RjJAfguvB4acLg8fUNKicGdaDNGdGs+2bUPhYHa13c6
KtxS2E8rNmtKNCwav7Zou0Bbk9VLNY9QYNRA+JjgFncVQwqTc=</
xenc:CipherValue>
  </xenc:CipherData>
</xenc:EncryptedData>
</soap:Body>
</soap:Envelope>
0
```

## Security Demo

- Let's take our previous demo
- Add a username token
- The verify the token on the server side
- Finally, encrypt the message with an x.509 cert
  - Many other security actions possible, these are just a couple...



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- Add a username token
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# Q & A

- Questions?
- My contact info: [KeithBa@microsoft.com](mailto:KeithBa@microsoft.com)
- Website: <http://xws>
- BTW, we are always looking for good testers:

